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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/687,550

10/15/2003

Edward J. Seppi

VM7036492003

7696

55499

7590

10/30/2008

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EXAMINER

MALEVIC, DJURA

ART UNIT

PAPER NUMBER

2884

MAIL DATE

DELIVERY MODE

10/30/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/687,550	Applicant(s) SEPPI ET AL.	
	Examiner DJURA MALEVIC	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 11-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9 and 11-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The amendment filed 06/18/2008 was entered.

Response to Arguments

Applicant's arguments filed 06/18/2008 have been fully considered but they are not persuasive.

With regards to claims 1 and 9, Applicant argues that Frank fails to show two different materials but shows two different chemical compositions. The examiner respectfully disagrees. The examiner appreciate that "two different chemical compositions" are two different materials. For additional art, see Barnes 5,138,167, which teaches two separate scintillators incorporated in split energy radiation detection (Col. 5, Lines 10 -19).

With regards to claims 18, 41 and 52, Applicant argues that the teachings of Barnes, who shows different semiconductors for different energies, would not have guided one skilled in the art to modify Bogatu, since Barnes teaches a different configuration (Stacked configuration) to Bogatus' (side-by-side configuration). For clarity, first and second photo conducting elements either forming a surface or arranged side-by-side which is substantially equivalent to said "a surface". The examiner respectfully disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references

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would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In this instance, Bogatu states that his invention is used to enhance the contrast and spatial resolution of an image. One skilled in the art knows that it is well known that a dual energy side-by-side detector reduces the possibility of motion artifacts and of edge artifacts, which will also enhance the contrast and spatial resolution of the image. In this instance, Barnes shows dual energy detector comprising different semiconductors which correlates to enhanced results in the dual energy detector. Although, Barnes teaches a stacked configuration, this does not change the fact that different semiconductors correlates to enhanced results in a dual energy detector and one skill in the art would have understood this as an obvious and/or common sense modification that would also apply to a side-by-side configuration, thus the rejection stands.

With regards to claims 12 and 22, Applicant argues that Bogatu fails to disclose filters above and below the K-edge energy levels. Bogatu shows that the filters are above and below the K-edge energy levels (See paragraph 12).

With regards to claim 29, Applicant argues that Bogatu does not expressly disclose generating electron-hole-pairs; however electron hole pairs are inherent to said semiconductors.

With regards to claim 35, applicant argues that Bogatu fails to disclose a conversion layer for generating photons in response to radiation. The examiner

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respectfully disagrees. Bogatu shows that the detector may include scintillators with photo-multipliers [0032].

With regards to claim 23, applicant argues that Bogatu fails to disclose the well known checkerboard pattern. See figure 8b which shows elements 32 and 34 in a checker board configuration. For additional art, see already cited art Mezess (US Patent 5,841,833) (Figures 21 or 24).

With regards to claim 17 and 27, applicant argues that Mazess or Bogatu fails to disclose an access circuit. The claimed access circuit is considered inherent in the system cited, since all these images are in real time and need simultaneously processing. Both of these imagers have their detectors connected to a computer which is accessing the detected data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 6- 9, 11, 13-17 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazess et al. (US Patent 5,841,833) in view of Frank et al. (US 6,445,765 B1).

With regards to claim 1, Mazess discloses a detector assembly (Figure 21 –23), comprising: a plurality of first imaging elements made from a scintillating material 308

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that has a first radiation detection characteristic; and a plurality of second imaging elements made from a scintillating material 312 that has a second radiation detection characteristic (i.e. high and low energies) (Col. 27, Lines 23 – 45). Mazess further discloses that the said detector comprises scintillating materials for rows and column as claimed (Col.2, Lines 3-4; Col.2, Lines 53-54). Mazess further discloses different sizes and also implies different materials as is known and appreciated in the art (Col. 27, Lines 23 – 45), although not directly expressed. Nonetheless, Franks expressly teaches different materials and sizes that exhibit different sensitivities to different energies (Col. 1, Line 24 and Line 45). Thus, one skill in the art can appreciate the selection of known equivalents would be considered an obvious matter of design choice within the level of ordinary skill in the art, depending on the needs of the application and/or creator.

With regards to claim 2, Mazess discloses either or both of the first imaging elements and the second imaging elements comprise a scintillating material for converting x-ray radiation into photons (Col. 27, Line 11) (Figure 21).

With regards to claim 6, Mazess discloses the first imaging elements and the second imaging elements are arranged relative to each other in a checkerboard pattern (Figure 21).

With regards to claim 7, Mazess discloses the first imaging elements are arranged in a plurality of first lines, and the second imaging elements are arranged in a plurality of second lines (Col. 2, Lines 53-54).

With regards to claim 8, Mazess discloses each of the first lines is positioned adjacent to one of the second lines (Col. 2, Lines 53-54) (Figure 27).

With regards to claims 9 and 46, Mazess discloses a radiation projection detector for generating signals in response to a radiation beam (Figure 21), comprising: a conversion panel (Figure 21) configured to generate light photons (i.e. scintillation) in response to a radiation, the conversion panel having a plurality of first conversion elements 308 and a plurality of second conversion elements 312; and a photo detector array aligned with the conversion panel (Figure 22), the photo detector array comprises a plurality of detector elements, each of the detector elements configured to generate a signal in response to light photons received (i.e. photo diodes) from the conversion panel; wherein each of the first conversion elements has a first radiation to photon conversion characteristic, and each of the second conversion elements has a second radiation to photon conversion characteristic (Col. 27, Lines 23 – 45). Mazess further discloses that the said detector comprises scintillating materials for rows and column as claimed. Mazess further discloses different sizes and also implies different materials as is known and appreciated in the art (Col.2, Lines 3-4; Col.2, Lines 53-54), although not directly expressed. Nonetheless, Franks expressly teaches different materials and sizes that exhibit different sensitivities to different energies (Col. 1, Line 24 and Line 45). Thus, one skill in the art can appreciate the selection of known equivalents would be considered an obvious matter of design choice within the level of ordinary skill in the art, depending on the needs of the application and/or creator.

With regards to claim 11, Mazess discloses the first conversion elements are configured for generating light photons in response to radiation at a first energy level,

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and the second conversion elements are configured for generating light photons in response to radiation at a second energy level (Col 27, Lines 23 – 45).

With regards to claim 13, Mazess discloses a checkerboard pattern (Figure 21).

With regards to claim 14, Mazess discloses the plurality of the first and the second conversion elements are arranged in a plurality of lines, and each of the plurality of lines of the first conversion elements is located adjacent one of the plurality of lines of the second conversion elements (Figure 7, Col. 2, Lines 47-57).

With regards to claim 15, Mazess discloses the plurality of detector elements comprises a plurality of first detector elements and a plurality of second detector elements (Figures 27, 21 –23).

With regards to claim 16, Mazess discloses the plurality of the first detector elements are configured to generate signals in response to photons having a first energy level, and the plurality of the second detector elements are configured to generate signals in response to photons having a second energy level (Col. 27, Lines 23 – 45).

With regards to claim 17, Mazess discloses the plurality of detector elements are arranged in a plurality of lines, and the detector further comprising an access circuit coupled to the photo detector array and configured to collect signals from two or more of the lines of the detector elements simultaneously (Col. 2, Line 47 – 57) (Claim 5).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazess in view of Bogatu et al. (US Publication 2002/0191751 A1).

With regards to claim 12, Mazess discloses the claim invention according to claim 11 and a k-edge filter for dual energy purposes, but fails to disclose a filter having a first energy below the k-edge agent and a second filter having a second energy level above the k-edge of a contrast agent (Col 1, Line 4 –55). Bogatu discloses filters with lower and higher energies correlating to lower and above the K-edge agent [0013]. Thus, it would have been obvious to one skill in the art at the time the invention was made to modify Mazess to include a filter having a first energy below the k-edge agent and a second filter having a second energy level above the k-edge of a contrast agent such as that taught by Bogatu to increase image contrast.

Claims 4, 5, 18 – 23, 25 – 28, 41, 45 and 47 - 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu in view of Barnes (US Patent 5,138,167).

With regards to claims 18, 19, 41 and 47 - 55, Bogatu discloses a radiation projection detector for generating signals in response to a radiation beam (Figure 8a – 8c), comprising: a photoconductor layer configured to generate charges in response to radiation; and a detector array aligned with the photoconductor layer [0046], the detector array comprises a plurality of detector elements, each of which configured to generate a signal in response to a charge received from the photoconductor layer. Note, Bogatu teaches a side-by-side detector, thus disclosing a first and second detectors formed in a planer surface. Bogatu does not expressly disclose the photoconductor

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layer further comprising first photoconductor elements having a first charge-generating characteristic, second photoconductor elements having second charge-generating characteristic. Barnes teaches dual energy solid-state detectors comprising different semiconductor materials (i.e. the combination of Lead oxide and mercuric oxide) (Col. 11, Line 50 – 55). Thus, it would have been obvious to one skill in the art at the time the invention was made to modify Bogatu to include different semiconductors such as that taught by Barnes in order to improve the detections accuracy and sensitivity.

With regard to claims 4 and 5, Barnes discloses HgI_2 and PbI_2 (Col. 11, Line 48 – 56).

With regards to claim 20, Barnes discloses different thicknesses for the first and second photoconductors (Col. 11, Line 27 – 43).

With regards to claims 21 and 22, Bogatu discloses a filter pair having two different filters used to successively filter each beam according to the K_{EDGE} . Specifically, a first filter that is greater and a second filter that is slightly less than the $K_{\text{EDGE,CONTRAST AGENT}}$, thus providing first radiation characteristic above $K_{\text{EDGE,CONTRAST AGENT}}$ and second radiation characteristic below $K_{\text{EDGE,CONTRAST AGENT}}$ [0044].

With regards to claims 23, 25 and 42, Bogatu discloses that the detector comprises first and second imaging elements arranged relative to each other in a checkerboard pattern [0046], thus disclosing a plurality of detectors elements comprising first and second detector elements.

With regards to claim 26 and 27, Bogatu discloses that each detector is electrically wired to a computer to allow the signals generated by the detectors to be processed [0046].

With regards to claim 28, Barnes discloses the photoconductors elements are made from HgI_2 and PbI_2 (See rejection above).

With regards to claim 45, Bogatu modified does not expressly disclose generating electron-hole-pairs; however electron hole pairs are inherent to said semiconductors.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Barnes in view of Yamazaki et al. (US Patent 5,570,403).

With regards to claim 24, Bogatu discloses the claimed invention according to claim 18. Bogatu modified does not disclose the first and second imaging elements arranged in a plurality of lines positioned adjacent to one another. Yamazaki teaches an X-ray detection apparatus with varied energy level capability comprising alternating detector rows (Figure 8). It would have been obvious at the time the invention was made to one skilled in the art to further modify Bogatu with alternating detector rows as taught by Yamazaki in order to acquire two sets worth of data.

Claims 29, 31, 32, 34, 35, 37, 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu et al. (US Publication 2002/0191751 A1) in view of Maekawa (EP 1016881 A2)

With regards to claims 29 and 40, Bogatu discloses a radiation projection detector for generating signals in response to a radiation beam (Figures 8a –8c), comprising: a first filter having a first radiation filtering characteristic; a second filter having a second radiation filtering characteristic; a photoconductor layer aligned with the first and the second filters; a detector array aligned with the photoconductor layer. Bogatu fails to

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expressly disclose first and second filters are physically coupled to the photodetector layer. Note, it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art.

Nonetheless, Maekawa teaches a filter physically coupled to a photodetector (see figure 3). Thus, one skill in the art can appreciate the selection of known equivalents would be considered an obvious matter of design choice within the level of ordinary skill in the art, depending on the needs of the application and/or creator.

Regarding claims 31, 32 and 37, Bogatu discloses a filter array arranged in an alternating checkerboard pattern [0045], thus disclosing a plurality of first and second regions.

Regarding claim 34, Bogatu discloses the filters and detectors aligned according to first and second photoconductors and filters (Fig. 8a – 8c).

With regarding to claim 35, Bogatu discloses a conversion layer (Fig. 8a – 8c) comprising amorphous silicon array and first and second filters 32q and 34q comprising first and second characteristics, wherein the first and second filters are coupled to the conversion layer, thus also components of the detector. Additionally, Bogatu discloses a detector array aligned with the conversion layer.

With regards to claims 37 and 38, Bogatu discloses a filter array arranged in an alternating checkerboard pattern [0045], thus disclosing a plurality of first and second regions.

Claims 30 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Maekawa in view of Albagli (US Patent 6,418,193 B1).

With regards to claims 30 and 36, Bogatu modified discloses the invention according to claims 29 and 35. Bogatu does not expressly disclose the first and second filters prepared from a material selected from a group consisting of aluminum, copper, and molybdenum. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a filter comprising aluminum, copper, and molybdenum, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. One would also have been motivated to include in Bogatu, a filter comprising aluminum, copper, and molybdenum such as that taught by Albagli (Col. 1, Line 12) in order to use the preferred materials for spectral filters (Col. 1, Line 12).

Claims 33 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Maekawa in view of Yamazaki.

With regards to claims 33 and 39, Bogatu modified discloses the claimed invention according to claims 31 and 37. Bogatu does not disclose the first and second imaging elements arranged in a plurality of lines positioned adjacent to one another. Yamazaki teaches an X-ray detection apparatus with varied energy level capability comprising alternating detector rows (Figure 8). It would have been obvious at the time the invention was made to one skilled in the art to modify Bogatu with alternating detector rows as taught by Yamazaki in order to acquire two sets worth of data.

Claim 43 and 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bogatu and Barnes in view of Mazess.

With regards to claim 43 and 44, Bogatu modified discloses the claim invention according to claim 41, but fails to expressly disclose the imaging elements adjacent to each other in a plurality of lines. Mazess teaches an imaging detector comprising imaging elements adjacent to each other in a plurality of lines (See rejection above). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Barnes to include imaging elements adjacent to each other in a plurality of lines such as that taught by Mazess in order to improve the sensitivity of the image.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DJURA MALEVIC whose telephone number is

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571.272.5975. The examiner can normally be reached on Monday - Friday between 8:30am and 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571.272.2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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